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ABSTRACT

This study tested the hypothesis that the memory of meaningful material can be reactivated without relearning by means of hypnotic suggestion. Very susceptible (T) and non-susceptible (UT) subjects were sought from among those who volunteered for the experiment. Two forms of a memory test for connected meaningful material were developed. Each form consisted of an article 513 words in length and a test of recall for each form consisting of 33 short answer questions. The subject was allowed five minutes to read the article and eight minutes to answer all questions. The results indicated that hypnosis per se does not affect peripheral or related variables which interfere with learning such as anxiety, ease of distraction, or difficulty of concentration. When the variables were eliminated, the establishing of rapport and a good relationship; the utilizing of exhortative and alerting instructions created no hypnotic effect on memory. Tables and test materials are included. (Author/EK)

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Reactivation of Memory by Hypnosis and Suggestion

Perry London
Psychological Research and Service Center
University of Southern California
Los Angeles, California

October 1968

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Reactivation of Memory by Hypnosis and Suggestion[1]

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and

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October 31, 1968

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Problems Under Consideration

The purpose of this research was to investigate the effects of hypnosis and suggestion upon the memory of meaningful material. Specifically, it sought to test the hypothesis that the memory of such material can be reactivated without relearning by means of hypnotic suggestion. In doing so, an attempt was made to examine the relation between hypnotic susceptibility, hypnosis, and memory for previously learned material.

Detailed background discussion and references on the type and development of appropriate materials to be used in this study was presented in the previous Progress Report (April 30, 1968) and will not be repeated here. A brief review of studies attempting to evaluate the effects of hypnosis on learning and the memory process follows:

The studies dealing with hypnosis and learning can be roughly divided into two groups: 1) Studies investigating the effects of hypnosis per se on learning. 2) Studies in which suggestions for improved performance were given to the hypnotized subjects.

The studies belonging to the first group are exemplified by the experiments performed by Das (1961), Rosenhan and London(1963), and Schulman and London (1963).

Das (1961) tested six somnambulistic Ss under three different conditions: 1)learning the material in the waking state and testing for recall under hypnosis, 2) learning the material under hypnosis, suggesting the post-hypnotic amnesia then being awakened and testing for recall, and 3) both learning the material and being tested for recall in waking state. No improvement in acquisition or recall was found when hypnosis was utilized.

Rosenhan and London (1963) let their subjects learn equivalent lists of nonsense syllables presented under counterbalanced waking and hypnotic conditions. There were two groups of subjects in this experiment, "good" and a "poor" hypnotic group. The "good" subjects showed a slight, significant decrement in learning performance under the hypnotic condition, and the"poor" subjects significantly improved their performance after they had received the hypnotic induction.

Schulman and London(1963)divided a group of 60 female subjects into very good, good and poor hypnotic groups. Poems of equivalent difficulty and lists of nonsense syllables were presented to the subjects in counterbalanced hypnotic and nonhypnotic conditions. No significant difference was found in performance of the above groups under either the waking or hypnotic conditions.

The above sutdies suggest that hypnosis by itself without suggestions for improved performance enhances neither learning nor recall.

The studies by Hammer (1954) and Stalnaker and Riddle (1932) illustrate experiments in which the subjects were given hypnotic suggestions of improved performance.

Hammer (1954) tested nine somnambulistic subjects on 25 tasks. Each S was tested four times, twice under normal conditions and twice after receiving

hypnotic suggestions of high motivation and increased ability. The Ss performed better after they received posthypnotic suggestions. Since the tests used in this experiment measured attention, perception, speed of associations, speed of reading comprehension, application of abstract ability, learning and memory, Hammer concluded that posthypnotic suggestion can be of aid in hypnotizable college students' school work.

Stalnaker and Riddle (1932) used 12 subjects and tested them for long delayed recall of prose and poems. The subjects learned the material in the waking state and after a year or more they were tested for recall in counterbalanced waking and hypnotic states. Emphatic suggestions were given that recall would be easy. The trance state was found 64.9 per cent more effective than the waking state. Every subject showed some improvement in recall, the improvements ranging from 18 to 259 per cent.

Although the two above mentioned studies were not well controlled a tentative conclusion may be reached that the subject's performance on learning tasks for meaningful material can be improved with appropriate hypnotic and posthypnotic suggestions.

In summary, the evidence suggests that hypnosis per se does not produce better acquisition or recall in learning situations, but that hypnotic suggestions of improved memory and high motivation to learn or recall may result in improved performance when compared with performance without hypnosis.

Method

Subjects

Volunteers of both sexes were solicited from various classes (including Introductory Psychology), and by advertisements in the school papers at the University of Southern California, the California State College at Los Angeles[2], and Brigham Young University.

Very susceptible (T) and non-susceptible (UT) subjects were sought from among those who volunteered. In order to qualify as (T), Ss had to pass eight or more items on each of three susceptibility scales administered; to qualify as a (UT) Ss had to score four or less on each of the scales. Any S that did not fall into one of these two groups was eliminated from the study at that point. The Harvard Group Scale of Hypnotic Susceptibility (HGSHS) (Shor and Orne, 1962) was administered by tape to small groups. After qualifying on the HGSHS, S was administered the Stanford Hypnotic Susceptibility Scale, Form B (Weitzenhoffer and Hilgard, 1959) one week later, and the Stnaford Hypnotic Susceptibility Scale, Form C (Weitzenhoffer and Hilgard, 1962)another week later. The susceptibility scales were administered by four experimental hypnotists who had had extensive experience.

The experiment proper was conducted by one of the experimental hypnotists who had no previous knowledge of the S's hypnotic susceptibility scores.

For purposes of control and comparison, it was necessary to test the memory of each S in both a waking and hypnotic state. To control for practice effects, both the (T) and (UT) groups were further divided into two groups. Half were tested for memory in a hypnotic state first, and a waking state second; the other group was tested in the reverse order. After a sujbect had received all three susceptibility scales, and it was determined that he qualified

as a (T) or a (UT), he was randomly assigned to a "waking first" group or a"hypnosis first" group. Thus, for the experiment proper there were four conditions: (T), "waking first;" (T), "hypnosis first;" (UT), "waking first;" and (UT) "hypnosis first."

Experimental Materials

Two forms of a memory test for connected meaninful material were developed. Each form consisted of an article 513 words in length about a rare chemical. The two test forms were constructed to be equivalent in the amount and type of information they contained. A test of recall for each form consisted of 33 specific short answer questions. The S was allowed five minutes to read the article and eight minutes to answer all the questions. (See Appendix B). A detailed description of the material as well as information regarding its standardization was presented in the Progress Report dated April 30, 1968.

Procedure

Each S was asked to sign a participation form and supply some biographical information (See Appendix A) prior to receiving the HGSHS. The Stanford Hypnotic Susceptibility Scale, Form B was administered during the first individual session. After the individual administration of the Stnaford Hypnotic Susceptibility Scale, Form B, the S was awakened and given Form A of the reading material and the test of recall. (See Appendix C for the exact instructions utilized.)

One week later S was given a test of memory for the reading material, Form A. This test was included in the design to evaluate the hypothesis that different abse rate amounts of material are learned by (T) and (UT), as had been found in other studies (Rosenhan and London, 1963; and London, Conant and Davison, 1966).

After the memory test, the S was administered the Stanford Hypnotic Susceptibility Scale, Form C. He was then awakened and given the Reading Material Form B. The instructions for reading this material were the same as for Form A, as follows:

"Note that the instructions are the same as before: 'Read the article very carefully with full attention and intention to remember it. Shut out all distracting thoughts and sounds, and concentrate on this task. The mind is capable of far more than we might expect, it we only push ourselves to the utmost and really concentrate on what we are doing. YOU WILL BE GIVEN FIVE MINUTES TO READ THE ARTICLE. I will indicate at the end of each minute the amount of time remaining. If you finish the article before the five minute period is over, you may go back and reread all or part of the article as you desire. DO NOT UNDERLINE OR MARK THE ARTICLE (TEST MATERIAL) IN ANY WAY.'" The test for memory of Form B was given to the S with the following instructions:

"The test of memory will be given to you immediately after you finish reading the article. Once you have started answering the questions, you cannot go back and reread any part of the article. YOU WILL BE GIVEN 8 MINUTES FOR THE TEST OF RECALL. It consists of 33 questions on which short, specific answers should be given. Do n ot make wild guesses but do write down any answer that you believe might be correct." This score was recorded as a base rate memory score against which to compare the amount subsequen tly remembered. (See Appendix D for the exact wording of this entire session.)

Two weeks after the second individual session, S returned for the final session. S's had previously been assigned to one of the order conditions.

Previous research has indicated the importance of exhortation as well as involving instructions in increasing the effect of hypnosis on various activities (Slotnick, Liebert, and Hilgard, 1965; London and Fuhrer, 1961; and Slotnick and London, 1965), and the importance of alertness under hypnosis for learning tasks (Liebert, Rubin, and Hilgard,1965). Consequently, the instructions for this thrid session incorporated these factors, and for the waking conditions were as follows:

"There is a growing body of evidence that people do not normally use their capabilities to the fullest. For example, some scientists have found evidence that every stimulus, event, or fact which we have attended to is permanently stored in the brain, and can be reactivated under proper conditions. Yet psychologists have learned that most people tend to underestimate their ability to remember facts and information. But I am going to tell you some things that will let you discover the real extent of your abilities. There is evidence that with the proper set and orientation, the mind, like the body, is capable of far more than people believe.

You remember, for example, how apparently impossible a four-minute mile used to be considered--that is, until one man was able to do it. In the same way, the mind is capable of far more than we might think, if only we push ourselves to the utmost and really concentrate on what we are doing.

Shut out all distracting thoughts and sounds, and concentrate on this task. When you try harder, you will find that you will remember still more of the information.

If you will mobilize all your energies of concentration block out all distractions, you can become completely alert and attentive; by doing this and yet not becoming hypnotized you can actively perform tasks better than you would otherwise. As I count to five you will become as alert as you possibly can, and you will remain alert and attentive. You will <u>not</u> become hypnotized, but you will become very alert ... one ... you are getting more and more alert ... two ... mentally active and attentive ... three ... four ... soon you will be ready to tackle any task you are asked to perform ... five you are very alert and ready to concentrate ... very alert.

In order to perform at your maximum you must imagine what it is like to do the task to the best of your ability and then you will actually begin to feel more alert, attentive, and more capable, enabling you to actually perform at your best.

I want you to think of yourself as being able to remember easily and completely, and you will find that you will be able to do so. I want you to have anunusually strong desire to do well. You will do extremely well. I am taking it for granted that you are here because you want to be, because you want to help the scientific process towards discovering new things about our minds; and for this research that means that you are eager to explore your potentialities with us and do your utmost on these tasks. It is very important to us, in conducting the experiment, to find out exactly how well you can do on this task. You are

very alert and because of this you will be able to concentrate on the task ... You are not becoming hypnotized and you must not allow yourself to enter a hypnotic state."

S was then given the test of recall for Form B. The suggestion for alertness in the hypnotic conditions were:

"Sleepiness and drowsiness, which are sometimes associated with hypnosis, are not essential to experiencing it. Most people think of hypnosis as a state resembling sleep, since this is often suggested in the induction. The hypnotic state can be a dreamlike state, but it can also be a time when one is completely alert and attentive; with the aid of hypnosis you can block out distractions in the environment and therefore actively perform many tasks even better than you would in the normal state; in fact, it has been demonstrated that a hypnotic subject can behave very much like a waking subject and still remain in the hypnotic state ... Now, as I count to five, you will become as alert as you possibly can, and you will remain alert until I ask you to wake up or be otherwise ... you will become very alert and still remain hypnotized ...one ... you are getting more and more alert, less and less drowsy; two ... mentally active, no longer drowsy; three ... four ... soon you will be ready to tackle any task that you are asked to perform while hypnotized, and yet remain very alert; five ... deeply hypnotized and ready to concentrate ... and very alert." The suggestions for improved memory in the hypnotic condition were as follows:

"There is a growing body of evidence that people do not normally use their capabilities to the fullest. The mind is capable of far more than most people believe. For example, some scientists have found evidence that every stimulus, event or fact which we have attended to is permanently stored in the brain, and can be reactivated under proper conditions. Yet psychologists have learned that most people tend to underestimate their ability to remember fact and infomation. But, I am now going to tell you some things that will let you discover the real extent of your abilities. I t has been shown that concentrating intensely, permitting nothing to distract you, makes it possible to remember very much more than you would have otherwise expected. Similarly, really desiring and striving to remember, helps to overcome any difficulties there may ordinarily be in doing so. You will find that the more you desire to remember, the more you will remember.

Today, while hypnotized, you will think of yourself as being able to remember easily and completely, and you will actually be able to do so. You will do extremely well. In a moment I am going to count from one to ten, and as I count, because of the hypnotized state you are now in, you will actually feel your memory ability increasing. Your desire and your capacity to remember and do well will increase with each number that I say. One ... your mind is clearing ... two ... you are remaining very alert, and becoming more so ... three ... your desire to do well is increasing ... four ... five ... your ability to concentrate is increasing ... six ... seven ... you can feel yourself becoming even more alert ... eight ... a greater and greater desire to remember ... nine ... ten.

Now I want you to repeat after me. 'I can feel that my memory ability has increased.'" (Wait for repetition.)

The exact wording for the entire session for the "waking first" group can be found in Appendix E, and for the "hypnosis first" group in Appendix F. The S was given the test of recall for Form B.

Results

The random assignment of Ss into the two order conditions successfully produced two equivalent groups in regard to susceptibility. No significant differences were found for nay of the three susceptibility scales nor for the mean of these three scores between the order groups in the (UT) as well as the (T) Ss. Table 1 summarizes this data. It should be noted that the mean of these three susceptibility scores for the (UT), "hypnosis first" group was 2.24 (S.S. = .69). The mean of the three scores for the (T) "waking first" group was 10.06 (S.D. = 1.10), and that for the "hypnosis first" group was 10.17 (S.D. = 1.19). The maximum score possible on each of the scales was 12, so that (T) Ss adequately represented those who are highly susceptible.

The first response to the Form B test of recall, given immediately after reading the material, was the index of the amount of material learned, and was a base against which recall two weeks later was to be compared to evaluate the effect of hypnosis on recovery of the material. Consequently it was necessary to evaluate and compare the amount of learning for the different treatment groups. There was surprisingly little difference among the groups on this measure of learning. The (UT), "waking first" group remembered a mean of 20.29 items (S.D. = 6.73); the (UT) "hypnosis first" group. 20.14 items (S.D. = 7.01); the (T), "waking first" group, 20.00 items (S.D. = 7126); and the (T), "hypnosis first" group, 21.17 items (S.D. = 4.24). There were no significant main effects nor interaction effect in regard to the original learning. Table 2 presents the summary of the analysis of variance of these scores. Because of this finding, the subsequent scores were analyzed without considering differences in the original learning scores.

As might be expected, the amount remembered after a two week waiting period was significantly less than the original amount remembered for all groups and under all condtions ($p < .001$). Table 3 presents the means and standard deviations of the memory scores for both groups in both conditions for each order. The means are very similar to each other here, also: the lowest was 7.17 for the (T), "waking first" order, tested while awake, and the largest was 9.75 for the same group and condition but for the "hypnosis first" order. Table 4 presents a summary of the analysis of variance for these data. No significant main effects nor interaction effects were found.

There are, however, some interesting trends which should be noted, although it should be emphasized that none of these trends are of sufficient magnitude to reach statistical significance. For both susceptibility groups, the scores on the memory test were higher for that conditions administered first, whether it was the waking condition or the hypnotic condition. This can be seen in Figure 1, which illustrates the data as graphed by order of presentation. This suggests that there is a practice effect, although the data do not permit any conclusions regarding its import in comparison to the hypnotic vs. waking condition effect.

TABLE 1

Means and Standard Deviations of Susceptibility Scores for All Groups and Conditions

Susceptibility Scale	"Waking First" Group	"Hypnosis First" Group	*t*	*p*
	Non-Susceptible (NS) Subjects			
HGSHS	2.00 (1.00)	3.14 (1.57)	1.62	= .20
SHSS-B	2.29 (1.70)	2.29 (1.38)	0.00	> .20
SHSS-C	1.57 (1.27)	1.29 (1.25)	.41	> .20
Mean	1.95 (1.14)	2.24 (.69)	.58	> .20
	Very Susceptible (VS) Subjects			
HGSHS	9.83 (1.34)	10.50 (1.51)	1.15	> .20
SHSS-B	10.75 (1.29)	10.42 (1.56)	.56	> .20
SHSS-C	9.58 (1.62)	9.58 (.99)	0.00	> .20
Mean	10.06 (1.10)	10.17 (1.19)	.24	> .20

TABLE 2

Summary of Analysis of Variance on
First Form B Test of Recall (Learning Score)

Source of Variation	*df*	MS	*F*
Susceptibility	1	1.20	.03
Order	1	4.45	.11
Susc. x Order	1	3.79	.10
Within Cells	34	39.53	
Total	37		

TABLE 3

Means and Standard Deviations of
Memory Scores

	"Hypnosis First" Order	"Waking First" Order
	Hypnotized Condition	
Very Traceable	9.00^{1a} (4.33) N = 12	8.33^{3b} (4.01) N = 12
Non Traceable	9.00^{2a} (6.66)	9.14^{4b} (4.45)
	Waking Condition	
Very Traceable	9.75^{1b} (4.73) N = 12	7.17^{3a} (3.49) N = 12
Non Traceable	9.14^{2b} (6.91) N = 7	8.86^{4a} (5.37) N = 7

TABLE 4

Summary of Analysis of Variance of
Memory Scores on Test of Recall

Source of Variation	*df*	MS	*F*
Between Ss	37	42.21	.94
Susceptibility	1	3.96	.09
Order	1	21.05	.47
Susc. x Order	1	10.67	.24
Error (between)	34	44.88	
Within Ss	38		
Hypnotic Con.	1	.47	.19
Hyp. Con x Susc.	1	.08	.03
Hyp. Con x Order	1	8.89	3.73
Hyp. Con. x Susc. x Order	1	2.45	1.03
Error (within)	34	2.39	
Total	75		

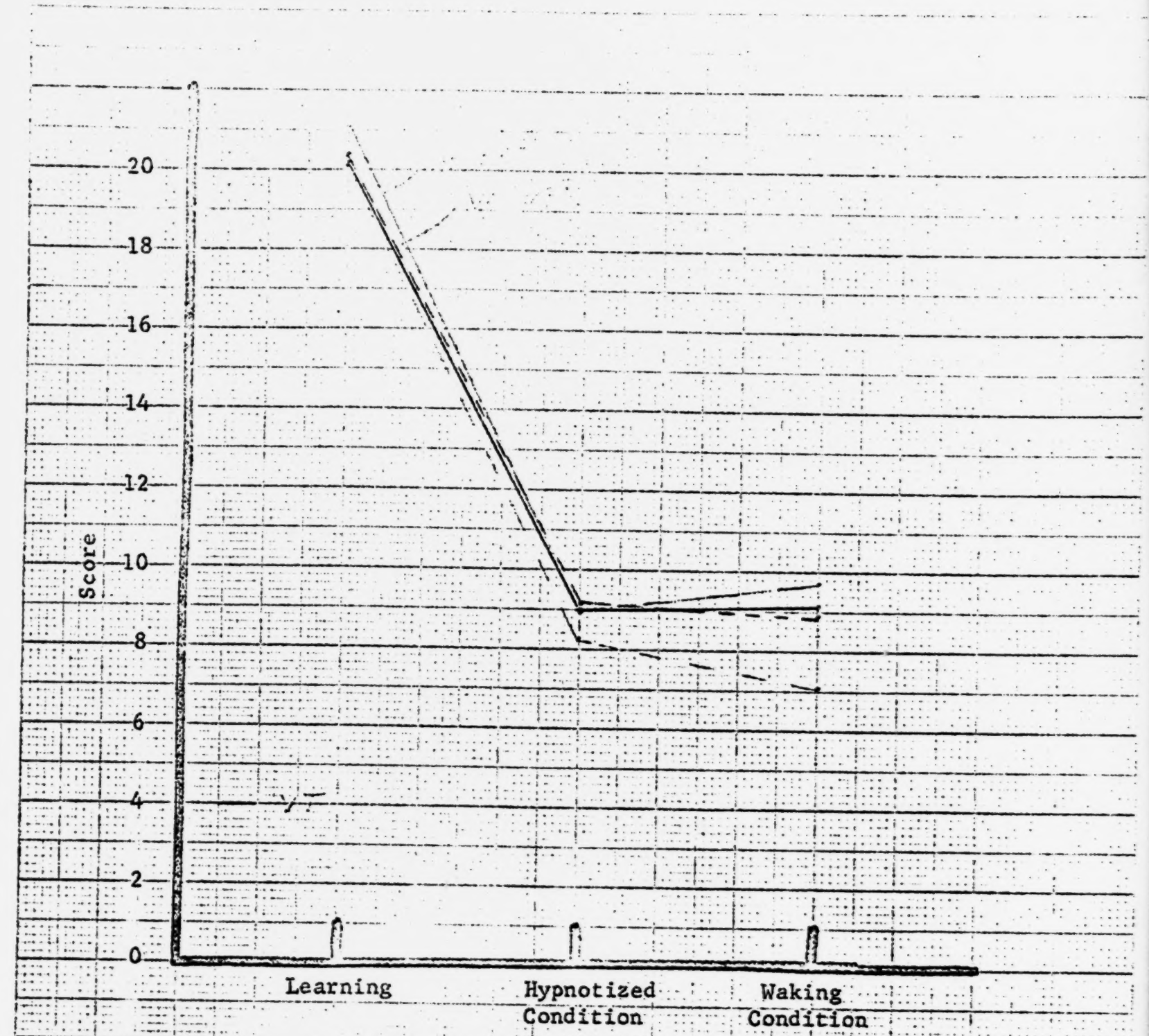
While none of the differences between the two memory tests for any of the groups reached significance, the greatest difference between the two was for the (T), "waking first" condition. This can be seen most readily in Figure 2 which graphs the data by order of presentation. The mean for the waking condition was 7.17 and for the hypnotic condition 8.33. Because this was not found (although in the reverse order) for the (T) "hypnosis first" condition, it should not be interpreted to imply a greater ability to remember, under hypnosis, but rather a "holding back" under the waking condition because the Ss were anticipating or expecting a hypnotic session. A post-experimental inquiry of many Ss, consisting of question about what they had expected to happen during the last session, elicited replies in one form or another form from everyone indicating that they had expected to be tested under a hypnotic condition. This has been found in other experiments. This "holding back" is probably related to unwittingly desiring or anticipating to do better when hypnotized. Because they came into the session expecting to be hypnotized they may well have become tense when they were not, were unable to concentrate, and did less well.

Discussion

The results of this study support the general conclusion summarizing the findings of other investigators discussed in the introduction to this report namely, that hypnosis per se does not affect peripheral or related variables which interfere with learning such as anxiety, ease of distraction, or its converse, difficulty of concentration. When you eliminate (control) these variables, as was attempted in this study by the repeated testing of susceptibility, the establishing of rapport and a good relationship, the utilizing of exhortative and alerting instructions, etc., no hypnotic effect on memory is observed. If there is one, it is certainly not a simple nor direct one.

These related variables are the very ones, however, which individuals talk about when they seek assistance in learning through the use of hypnosis. Clinically, then, the use of hypnosis in facilitating the learning process is still probably good, if the subjects are having difficulties with these influences. Experimentally, the effect of hypnosis might be demonstrated with a certain selected type of subjects, like cases of anxiety neurosis, as an extreme example. The Ss for this study were not of this or related types, but such research is of sufficient importance that it should be seriously undertaken.

Furthermore, the results of this study should not be interpreted to imply that hypnosis cannot be made to affect memory. They only suggest that it does not do so automatically, or by a merely exhortative process which attempts to capitalize directly on the fact that someone is hypnotized. Hypnosis might have a very pronounced effect, if utilized differently. Memory is not a simple thing, but a complex of skills. One type of such skills is what might be called "associative chaining", in which a person reconstructs past events by linking one small detail with another. Hypnosis may assist this process. This is quite different, however, from remembering a number of specific facts about a single chemical. It is premature to rule out the possible effects of hypnosis on the memory process when the complex process of memory itself is only now beginning to be investigated in a sophisticated manner. The results of this study indicate that the effect is not a simple one nor is it an automatic one.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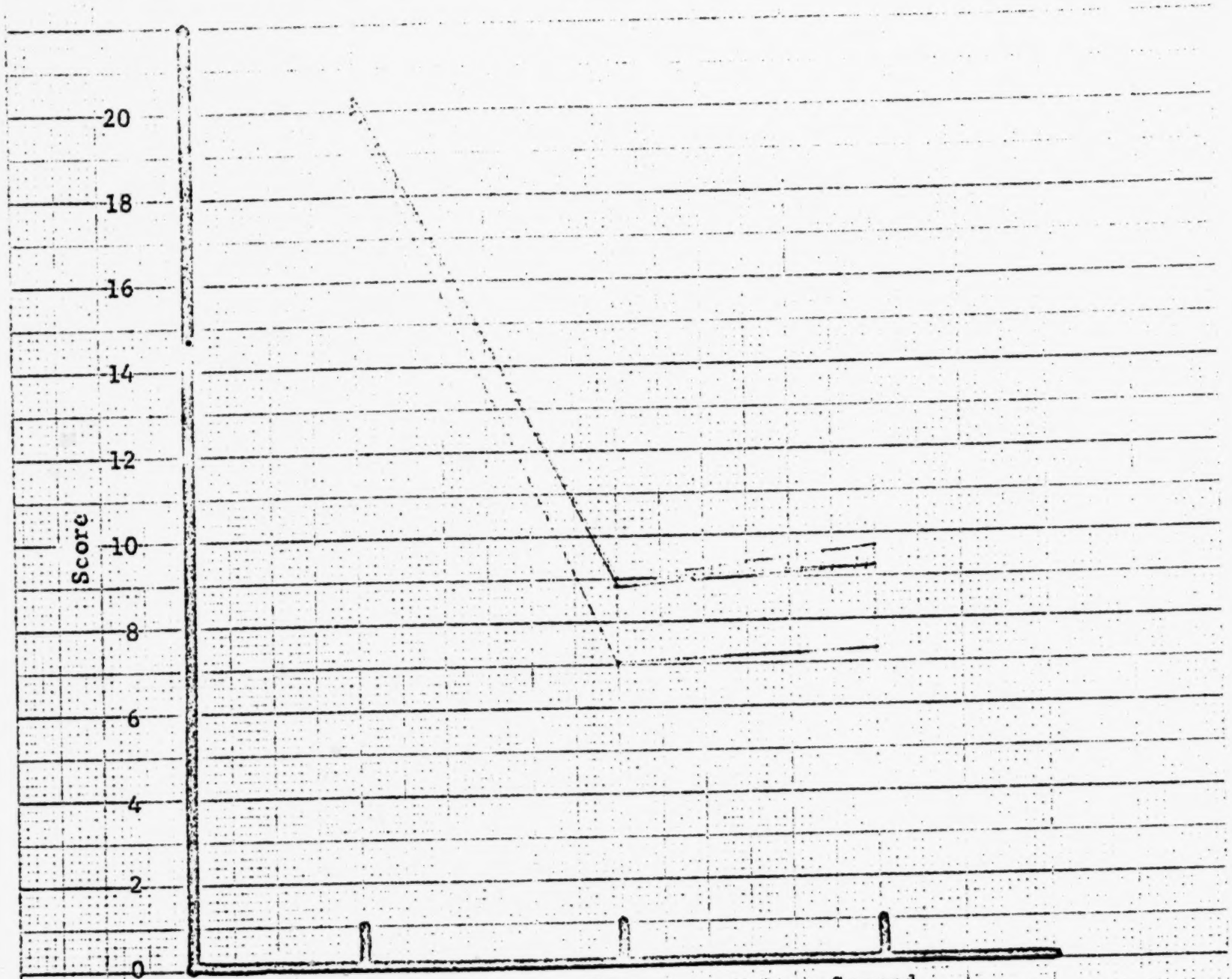
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Score
Learning
First Test
Second Test

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Footnotes

1 This investigation was supported by a Public Health Service Research Scientist Development Award Number K3-MH 31,209 from the National Institute of Mental Health.

2 We wish to express our appreciation to Dr. Gary Bunker, acting Chairman of the Department of Psychology at the California State College of Los Angeles and members of the department for their assistance in obtaining subjects and making research facilities available to us for this project.

Appendix A

The Public Health Service requires that we take precautions to protect the safety of human experimental subjects when engaging in psychological research sponsored by them. Therefore, we would appreciate your carefully reading the statement below and signing where indicated.

I agree to participate in psychological research and take various tests as appropriate to the measurement of imagery, hypnotic susceptibility, EEG, and other psychological measures. In doing, so, I understand that no physiologically harmful or personally embarassing experiences will be involved.

Signature_____

Date_____

Appendix B

INFORMATION SHEET

NAME (please print)_____

ADDRESS (please print)_____

Telephone Number_____ Sex_____

Age_____ Date of Birth_____

Race_____ Nationality_____

Year in college (class)_____ Major_____

Have you taken any courses in chemistry? YES_____ NO_____, If yes, please list most advanced course:

_____

Do you think that you are (or expect to be) a: very good_____, good_____,

average_____, poor_____, very poor_____ hypnotic subject?

Are you taking any kind of medication? Yes_____ No_____. If yes, what kind?

_____(Do not write below double line)_____

Group_____

Subject Number_____

HGSS_____

SHSS-B_____

SHSS-C_____

Form A_1_____

Form A_2_____

Form B_1_____

Form B_2_____

Form B_3_____

Appendix B

Name _____ Date _____

Major _____ Class _____ Sex _____

WHEN THE SIGNAL IS GIVEN, TURN THE PAGE AND START READING THE INSTRUCTIONS

MEMORY TEST

INSTRUCTIONS

Please read these instructions carefully because your test performance will be valid only if the rules are strictly followed.

The purpose of this test is to find out how much information you can remember after reading attentively an article of about 500 words.

Read the article very carefully with full attention and intention to remember it. Shut out all distracting thoughts and sounds, and concentrate on this task. The mind is capable of far more than we might expect, if we only push ourselves to the utmost and really concentrate on what we are doing. YOU WILL BE GIVEN FIVE MINUTES TO READ THE ARTICLE. I will indicate at the end of each minute the amount of time remaining. If you finish the article before the five minute period is over, you may go back and re-read all or part of the article as you desire. DO NOT UNDERLINE OR MARK IN ANY WAY THE ARTICLE (TEST MATERIAL).

The test of memory will be given to you immediately after you finish reading the article. Once you have started answering the questions you cannot go back and re-read any part of the article. YOU WILL BE GIVEN 8 MINUTES FOR THE TEST OF RECALL. It consists of 33 questions on which short, specific answers should be given. Do not make wild guesses but do write down any answer that you believe might be correct.

Example

In which year did Columbus discover America?

Answer 1492

IF YOU HAVE ANY QUESTIONS, PLEASE ASK NOW. SINCE THE TEST IS TIMED AND REQUIRES CONCENTRATION, ANY DISTURBANCE DURING TESTING MAY INVALIDATE SCORES OF THE ENTIRE GROUP.

NOW WAIT UNTIL YOU ARE GIVEN A SIGNAL TO TURN THIS PAGE AND START READING THE ARTICLE.

Appendix B

Test Material (A)

In 1817 a German chemist by the name of Berzelius found what he supposed to be a new earth. He named it "thorium" from Thor, son of the god Odin. At first he thought that this new earth was a compound of yttrium, but this was proved incorrect.

The most important deposits of thorium are in India which accounts for 90% of the world production of this element. The Brazilian deposits are second in richness. In the United States of America, Idaho has the greatest amount of thorium, but the quality of the ore found in Florida is better.

The element is silverly in color and it resembles platinum in appearance, hardness, and ductability. It melts at about 1,700 degrees C and in this respect it is also similar to platinum. Its chemical element number is 90 and its atomic weight is approximately 232. The greatest concentration of thorium is obtained from monazite sands which is found in the above mentioned places. The monazite is heavy and has a yellow color and peculiar luster. The chemical symbol of thorium is Th.

The first use of thorium was in production of incandescent gas mantles which were developed in the nineteenth century. The most important use of thorium at present is in the nuclear field, because it can be converted to an atomic fuel of uranium type. The energy available from the world's supply of thorium has been estimated as greater than the combined energy from all of the world's uranium, coal, and oil. The second major use of thorium is in magnesium technology, because it imparts to magnesium metal high-strength properties and creep resistance at elevated temperatures. The element has special use in ceramics since it enables the ceramic objects to resist high temperatures. In chemistry, thorium is used successfully as a catalyst in the synthesis of many organic compounds. In photography, thorium is added to preparations of flashlight powder to reduce the amount of smoke produced by such chemicals. Thorium has also found its application in medicine since its salts have a bacteriocidal action' thus, guinea pigs survived twice the lethal dose of cholera when they were treated with thorium salts. Finally, application of thorium in electrical industry can be mentioned, because it is used in special welding electrodes. The world's need for it amounts to 3,000 tons a year.

The extraction of thorium is a complex process and there are several methods to accomplish it. One method utilizes sulfuric acid and the purified thorium is crystallized from the chemical solution. However, thorium can be prepared directly from its compounds by the method of electrolysis.

Thorium forms compounds easily with a number of elements and other chemical compounds. A compound formed with oxygen gives a powder of white color. Nitrogen unites directly with thorium creating a dark red powder, and with sulfur thorium forms large brown crystals.

Thorium can be easiest detected in nature by studying radioactivity of the ore. If chemical analysis is employed for detection, sulfuric acid is used.

END

AppendixB

Form A

TEST OF RECALL

1. What is the name of the discoverer of the element described in this article?
2. How can this element be most easily detected in nature?
3. After whom was the element named?
4. What is the color of the pure element?
5. At what degree of temperature (Celsius) does it melt?
6. For what is it used in chemistry?
7. Where are the most important deposits of the element found?
8. What was the nationality of the discoverer of the element?
9. Which acid is used in extraction of the element?
10. What is the color of the compound of the element with nitrogen?
11. What is the use of the element in medicine?
12. Which acid is used to detect the element in nature?
13. What is the most important use of the element?
14. What is the atomic weight of the element?
15. Where are the second most important deposits of the element found?
16. In which year was the element discovered?
17. What is its chemical number?
18. What was the first use of the element?
19. Why is it used in ceramics?
20. What is the color of the compound of this element and oxygen?
21. What is the name of the element described in this article?
22. The melting point of this element is as high as the melting point of what other element?
23. Where in the USA are the greatest deposits of the element ?
24. Where in the USA are deposits of the best quality?
25. When the discoverer of the element first found it, he thought that it was a compound of which element?
26. What is the color of this element's compound with sulfur?
27. How else, besides by using an acid, can this element be extracted from its compound?
28. What is the chemical symbol of the element?
29. How many tons is the world's yearly need for this element?
30. What is the name of the mineral containing the greatest percentage of the element?
31. What is the name of the mineral which is the principal supply of this element?
32. For what is the element used in the electrical industry?
33. What other property besides resistance at high temperature does this element give to magnesium?

Test Material (B)

Up to the middle of the eighteenth centruy the minerals containing "tungsten" were considered to be compounds of tin. In 1783 two Spanish chemists, the brothers Elhujar, produced for the first time the mental tungsten. The name "tungsten" signifies "heavy stone."

China is the world's largest producer of tungsten; the Chinese deposits are located in four of her provinces. The Burma deposits are second in importance. Colorado produces most of tungsten in the United States and its ore is of the best quality known. Arizona is another state of importance in this country's tungsten production; deposits in other states are insignificant.

Tungsten is an element of steel-gray color and it is three times as hard as platinum. It has a very high melting point of about 3,400 degrees C, which is twice as high as that of platinum. Its atomic weight number is 184 and its chemical number is 74. Tungsten's official name is Wolfram and its symbol is W. The ores of commerical importance are of two general types, scheelite and wolframite. Separation of wolfram is easy from scheelite; scheelite is red in color and it is heavy and soft. Wolframite samples vary in purity.

The most important use of tungsten is in the production of steel alloys that are used in manufacturing high-speed tools. Tungsten stell is hard and it does not lose hardness when it becomes hot. Therefore it is an ideal metal for cutting tools and drills. Tools made from ordinary steel become blunt at high temperatures. In electric industry tungsten is generally used for filaments in electric light bulbs, because of its high melting point, and in this it has replaced platinum. High density, tungsten-nickel-copper alloys have been utilized for radiation shielding in space.travel. The element has been used in ceramics because it colors such products with shadows of yellow. Tungsten is used in chemistry to fireproof various fabrics and other materials exposed to high temperatures. In automobiles, tungsten is used for spark plugs because the mental resists corroding influence of many chemicals which destroy other metals. Since tungsten gives beautiful polish to alloys of which it is a part, tungsten is a highly valued metal in jewelry industry. Tungsten is, finally, also of importance in production of metal strings, because it gives them great strength; consequently,it is used in production of strings for musical instruments. About 20,000 tons of tungsten is used yearly in the world.

The best method of tungsten extraction consists in application of carbon sodium on the ore containing tungsten and then by purifying the obtained compound; the metallic tungsten can be obtained directly by simply melting the ore in vacuum by powerful electronic beams.

Tungsten has a remarkable ability to form complex compounds with several elements. When fluroine is applied on tungsten a yellow colored liquid is obtained. Phosphorus and tungsten compound is dark green in color. Sulfur combines directly with tungsten and forms black crystals.

Tungsten is easily detected in the ore by treating it with hydrochloric acid or by the microchemical evaluation of the ore's characteristic crystal structure.

End

Appendix B

Form B

TEST OF RECALL

1. What is the anme of the chemist who produced the element described in this article in the metallic form?
2. Which acid is used for an easy detection of this element in the nature?
3. What is the meaning of the unofficial, general name of the element?
4. What is the color of the element in pure form?
5. At what degree of temperature (Celsius)does it melt?
6. For what is it used in chemistry?
7. Where is the most important deposit of the element found?
8. What was the nationality of the chemist who produced the element in its metallic form for the first time?
9. Which chemical is used in extraction of the element from the ore?
10. What is the color of the compound of the element with sulfur?
11. What is the use of the element in production of musical instruments?
12. What aspect of the element does the microchemical evaluation study?
13. What is the most importnat use of the element?
14. What is the atomic weight of the element?
15. Where are the second most important desposits of the element found?
16. In which year was the element first produced in its metallic form?
17. What is its chemical number?
18. For what type of shielding are dense alloys of this element with copper and nickel used?
19. Why is it used in ceramics?
20. What is the color of the compound of this element with phosphorus?
21. What is the general, unofficial name of this element?
22. The melting point of this element is twice as high as the melting point of what other element?
23. Where in the USA is the greatest production of the element?
24. Which state in the USA is sceond in importance in production of this element?
25. It was thought originally that the minerals containing this element were compounds of what other element?
26. What is the color of the compound of this element with fluorine?
27. How is the ore melted in order to extract from it the metallic form of this element?
28. What is the chemical symbol of the element?
29. How many tons is the world's yearly need for this element?
30. What is the name of the mineral from which this element is easily extracted?
31. You were asked above about the name of the ore from which this element is easily extracted. There is another ore of commerical importance. What is its name?
32. What is the element used for in the electrical industry?
33. Why is the element used for spark plugs?

First Session

First have the S complete the "Information Sheet" if they have not already done so.

"One of the areas of interest in this research is learning and memory; so the first task today will be to have you respond to a memory test."

Hand S a "Memory Test, Reading Material, Form A".

"Please read the directions on the front page of this booklet through with me."

Read the directions out loud while the S is reading them to himself. Answer any questions S may have, then starting the stop watch,

"Please begin reading."

At the end of each minute, indicate the number of minutes remaining.

"You have (4,3,2,1) minute(s) left."

At the end of the five minutes:

"Please give me the booklet now."

Give S a "Test of Recall, Form A":

"Now, please write only your name and the date on this cover sheet, and then begin answering the questions on the next page."

Time S allowing 8 minutes but only indicating when there are 3, 2, and 1 minute(s) remaining:

"You have (3,2,1) minute(s) left."

At the end of eight minutes:

"Please give me the form. Now we would like to hypnotize you again. Today will be similar to the previous time in the group, but with some differences."

At this point proceed with the instructions for the SHSS Form B, page 30, 2nd paragraph, i.e., "Let me remind you again..." etc.
At the end of the session, personally make sure that the S is scheduled for another appointment ONE WEEK FROM THE DATE OF THE FIRST SESSION.

Second Session

"Last week you read an article and then answered some questions about it. We would like to see how much of the material you can still remember. In a moment, I am going to give you a booklet with some questions in it about the article. You will be given eight minutes for this test of recall. As before, short, specific answers should be given. Don't make wild guesses, but do write down any answer that you believe might be correct even if you are not sure. I will indicate when you have 3, 2, and 1 minutes remaining. Now please be alert, attentive, shuting out all distracting thoughts, and concentrate on remembering what you previously read."

Give S "Test of Recall, form A".

"Please write only your name and the date on this cover sheet, and then begin answering the questions on the next page."

(If S indicates that it is the same form as that used before answer by indicating: "That's all right, please answer as many of the questions as you can").

Time S allowing eight minutes for him to respond, but indicate only when there are 3, 2, and 1 minutes remaining:

"You have (3, 2, 1) minute(s) left."

At the end of eight minutes:

"Please give me the form. Now we would like to hypnotize you once again."

Paraphrase only the relevant material on page 5 and 6 of the Stanford Hypnotic Susceptibility Scale, Form C, as is appropriate in terms of the S's previous sessions.

"Most people, when they undergo the kinds of hypnotic experiences which you have had here previously, wonder just how well they have been responding to the suggestions that are given. They are concerned about whether or not they have been performing as they were expected to and whether or not they are really good hypnotic subjects. Perhaps you have had these same questions in connection with your earlier experiences here. The fact is that your performance earlier indicated clearly, in some of its significant details, that you are an excellent subject for the purposes of the experiment we are doing now."

Then proceed with (2) on page eight of the SHSS Form C.

Second Individual Session

"Now we would like you to read some new material and answer some questions about it."

Hand S a "Memory Test, Reading Material, Form B."

"Note that the instructions are the same as before: 'Read the article very carefully with full attention and intention to remember it. Shut out all distracting thoughts and sounds, and concentrate on this task. The mind is capable of far more than we might expect, if we only push ourselves to the utmost and really concentrate on what we are doing. YOU WILL BE GIVEN FIVE MINUTES TO READ THE ARTICLE. I will indicate at the end of each minute the amount of time remaining. If you finish the article before the five minute period is over, you may go back and re-read all or part of the article as you desire. DO NOT UNDERLINE OR MARK IN ANY WAY THE ARTICLE (TEST MATERIAL).

The test of memory will be given to you immediately after you finish reading the article. Once you have started answering the questions you cannot go back and re-read any part of the article. YOU WILL BE GIVEN 8 MINUTES FOR THE TEST OF RECALL. It consists of 33 questions on which short, specific answers should be given. Do not make wild guesses but do write down any answer that you belive might be correct.'"

"Do you have any questions?"

Start the stop watch, saying:

"Please begin reading."

At the end of each minute, indicate the number of minutes remaining:

"You have (4, 3, 2, 1) minute(s) left."

At the end of five minutes:

"Please give me the booklet now."

Give S a "Test of Recall, Form B":

"Now please write your name and the date on this cover sheet, and then begin answering the questions on the next page."

Time S allowing 8 minutes but only indicating when there are 3, 2, and 1 minute(s) remaining:

"You have (3, 2, 1) minute(s) left."

At the end of eight minutes:

"Please give me the form. Thank you for your help."

Personally make sure that the S is scheduled for an appointment TWO WEEKS FROM THE DATE OF THIS SESSION.

Third Session, Form W

I'd like you to sit back in your chair, relax, and close your eyes. Just listen to what I am going to tell you, but do not let yourself go into hypnosis. Remain relaxed, but alert and wide awake, with your eyes closed. It is very important that you do not go into a hypnotic state.

Let me remind you that your earlier performance has clearly indicated that you are an excellent subject for our experiment.

Two weeks ago you read a second reading selection and then answered some questions about it. I would like to see how much of that material you can still remember. But before I do, I want to tell you something.

There is a growing body of evidence that people do not normally use their capabilities to the fullest. For example, some scientists have found evidence that every stimulus, event, or fact which we have attended to is permanently sotred in the brain, and can be reactivated under proper conditions. Yet psychologists have learned that most people tend to underestimate their ability to remember facts and information. But, I am going to tell you somethings that will let you discover the real extent of your abilities. There is evidence that with the proper set and orientation, the mind, like the body, is capable of far more than people believe.

You remeber, for example, how apparently impossible a four-minute mile used to be considered--that is, until one man was able to do it. In the same way, the mind is capable of far more than we might think, if only we push ourselves to the utmost and really concentrate on what we are doing.

Shut out all distracting thoughts and sounds, and concentrate on this task. When you try harder, you will find that you will remember still more of the information.

If you will mobilize all your energies of concentration, block out all distractions, you can become completely alert and attentive; by doing this and yet not becoming hypnotized you can actively perform tasks better than you would other wise. As I count to five you will become as alert as you possibly can, and you will remain alert and attentive. You will <u>not</u> become hypnotized, but you will become very alert . . . one . ... you are getting more and more alert . . . two . . . mentally active and attentive . . . three . . . four. . . soon you will be ready to tackle any task you are asked to perform . . . five you are very alert and ready to concentrate . . . <u>very alert</u>.

In order to perform at your maximum you must imagine what it is like to do the task to the best of your ability and then you will actually begin to feel more alert, attentive, and more capable enabling you to actually perform at your best.

I want you to think of yourself as being able to remember easily and completely, and you will find that you will be able to do so. I want you to have an unusually strong desire to do well. You will do extremely well. I am taking it for granted that you are here because you want to be, because you want to help the scientific process towards discovering new things about our minds; and for this research that means that you are eager to explore your potentialities with us and do your potentialities with us and do your utmost on these tasks. It is very important to us, in conducting the experiment, to find out exactly how well you can do on this task. You are very alert and attentive and because of this you will be able to concentrate on the task. You are not becoming hypnotized and you must not allow your self to enter a hypnotic state.

In a moment I am going to give you a booklet with some questions in it about the article. You will be given eight minutes to complete this test of recall. As before, short, specific answers should be given. Don't make wild guesses, but do write down <u>anything</u> that may come to your mind that you believe might be correct even if you are not certain. Remain alert and attentive, shutting out all distract-

ing thoughts, and concentrate on remembering what you have previously read.
Hand S new "Test of Recall, Form B"
Now please write your name and date on the form. Time S and allow a full eight min utes, but do not indicate the passage of any time. (i.e. do not indicate when 3, 2 or 1 minute is left.)

At the end of eight minutes, That is fine, please give me the booklet. (Allow S to get a drink of water).

Now we will hypnotize you. Just relax in the chair and make yourself very comfortable. Just let your eyes close . . . that's it, just leave your eyes closed while I talk. The important thing is simply for you to relax in the chair, and enjoy this experience.

Because of your past experiences with hypnosis, you are aware of the feelings that you have as you become more and more deeply hypnotized. You will soon start having these feelings again as you continue to listen to me and become more and more relaxed.

As you relax there, you find it easy just to let things ride by your mind without attending very much to them. You can hear my voice clearly enough, and you can hear, in actuality any other sounds that are around the room--but it is too much effort for you to pay attention to those outside sounds, so nothing makes much impression onyour mind except the things that I am saying to you.

In fact, your attention becomes so fixed on what I am saying that you can completely forget about anything else--you stop thinking about anything except what I am about to tell you--you listen to me, very carefully, without any real effort on your part, and you disreagrd all other thoughts and memories. You become conscious of my voice only, It fills your mind and thoughts and leaves room for you to attend to nothing else.

You know that you can be hypnotized only if you want to be, but there is no reason for you to resist. Just concentrate upon my words and let happen whatever you feel is going to take place. Just let yourself go. What I want from you is merely your willingness to go along and to let happen whatever is about to happen. You know that nothing will be done to make you feel foolish nor to embarrassyou.

Now take it easy and just let yourself go. Don't be tense. Just listen carefully to my voice. If your thoughts wander away from it, that is all right, but bring your attention back to it. Sometimes my voice may seem to change a little, or sound as if it were coming from far off. That is all right. Whatever happens, accept it, and just keep listening to my voice as you become more and more relaxed . More and more relaxed. Just listen and relax. Whatever you feel is happening, just let it happen.

Relax more and more. As you <u>think</u> of relaxing, your muscles will relax. Starting with your right foot, relax the muscles of your right leg . . . Now the muscles of your left leg . . .just relax all over. Relax your right hand, your forearm, upper arm, and shoulder . . . . That's it. . .Now your left hand . . . and forearm and upper arm . . . and shoulder. Relax your neck, and chest . . . more and more relaxed. . . completely relaxed.

As you become more hypnotized your body will feel sort of heavy. You will begin to have this feeling of heaviness in your legs and feet . . . in your hands and arms. . . throughout your body . . . as though you were settling deep into the chair. The chair is strong; it will hold your body as it feels heavier and heavier. You are breathing freely and deeply, freely and deeply. Your whole body is becoming more and more heavy.

You are relaxed, very relaxed. By letting yourself go you become even more relaxed. You can reach a state of deeper, more complete relaxation. You can reach a state of deeper, more complete relaxation. There is a pleasant feeling of heaviness throughout your body. You begin to feel so relaxed. It is easier to bring your thoughts back from other things and to attend only to my voice. Soon you will just listen to my voice, as you become more and more deeply relaxed.

You are relaxed, very relaxed. Your whole body feels heavy and relaxed. You feel a pleasant warm tingling throughout your body. Keep your thoughts on what I am saying; listen to my voice. Soon there will be nothing to think of but my

voice and my words, while you relax more and more. There are no troubles, no cares to bother you now. Nothing seems important but what my voice is saying, nothing else is important now. You are interested only in what my voice is saying to you. Even my voice may sound a little strange, as though it comes to you in a dream, as you sink deeper into this heaviness, this deep relaxation. Relax, relax ... deeply relaxed. Deeper, deeper, deeper.

You are beginning to feel pleasantly hypnotized. Just keep your thoughts on what I am saying. You are going to become much more hypnotized. Soon you will be deeply hypnotized but you will have no trouble hearning me. You will not wake up until I tell you to .... Soon I shall begin to count from one to twenty. As I count you will feel yourself going down farther and farther and becoming more and more deeply hypnotized, but you will be able to do what I ask you to do without waking up .... One you are going to become more deeply hypnotized .... Two--down, down, ... Three ... four ... more and more relzxed ... five ... six ... seven ... you are sinking into a deep, deep state of hypnosis; nothing will disturb you. I would like you to hold your thoughts on my voice and those things I tell you to think of. You are finding it easy just to listen to the things I tell you .... Eight ... nine ... ten ... halfway there ... always more deeply relaxed ... eleven ... twelve ... thirteen ... fourteen ... fifteen ... although deeply hypnotized you can hear me clearly. You will always hear me distinctly no matter how deeply hypnotized you feel you are. You are going to experience many things that I will tell you to experience ... nineteen .... Twenty. Very deeply hypnotized. You will not wake up until I tell you to. You will wish to remain comfortably hypnotized and to have the experiences I will describe to you.

I want you to realize thatyou will be able to speak, to move, and even to open your eyes if I ask you to do so, and yet still remain just as deeply hypnotized as you are now. No matter what I ask you to do, you will remain deeply hypnotized as you are now. No matter what I ask you to do, you will remain deeply hypnotized until I tell you to wake up.

To show you that you can open your eyes, and still remain deeply hypnotized, I am going to slowly count from 1 to 3. When I do your eyes will open slowly, but you will remain very deeply hypnotized. Ready .... One ... two ... three. (Make sure eyes have opened) <u>There</u>, your eyes are open, but you are still deeply hypnotized ... and you will be able to do this whenever I might ask you to. Now just close your eyes again, and remain deeply hypnotized. You will find that as I continue to talk to you, my talking will continue to help you to become even more deeply hypnotized. Just listen to my voice.

Sleepiness and drowsiness, which are sometimes associated with hypnosis are not essential to experiencing it. Most people think of hypnosis as as state resembling sleep, since this often suggested in the induction. The hypnotic state can be a dreamlike state, but it can also be a time when one is completely alert and attentive; with the aid of hypnosis you can block out distractions in the environment and therefore actively perform many tasks even better than you would in the normal state; in fact, it has been demonstrated that a hypnotic subject can behave very much like a waking subject and still remain in the hypnotic state .... Now, as I count to five you will become as alert as you possibly can, and you will remain alert until I ask you to wake up or be otherwise... you will become very alert and still remain hypnotized ... one ... you are getting more and more alert, less and less drowsy; two ... mentally active, no longer drowsy; three... four ... soon you will be ready to tackle any task that you are asked to perform while hypnotized and yet remain very alert; five ... deeply hypnotized and ready to concentrate ... and <u>very alert</u>.

Now remain deeply hypnotized and alert, and continue to listen carefully to my words. I would like to see if you can remember anything else about the second article that you read two weeks ago. We are interested in comparing your ability to remember under hypnosis with your ability to remember when you were not hypnotized. But before I do, I want to tell you something. It has been shown that concentrating intensely, permitting nothing to distract you,makes it possible to remember very much more than you would have otherwise expected. Similarly, really desiring and striving to remember, helps to overcome any difficulties there may ordinarily be in doing so. You will find that the more you desire to remember the more you will remember.

Today, while hypnotized, you will think of yourself as being albe to remember easily and completely, and you will actually be able to do so. You will have an unusually strong desire to do well. You will do extremely well. In a moment I am going to count from one to ten, and as I count, because of the hypnotized state you are now in, you will actually feel your memory ability increasing. Your desire, and your capacity to remember and do well will increase with each number that I say. One ... your mind is clearning, ... two ... you are remaining very alert, and becoming more so ... three ... your desire to do well is increasing ... four ... five ... your ability to concentrate is increasing ... four ... five ... your ability to concentrate is increasing ... six ... seven ... you can feel yourself becoming even more alert ... eight ... a greater and greater desire to remember ... nine ... ten.

Now I want you to repeat after me. "I can feel that my memory ability has increased." (Wait for repetition) "I want very much to remember so that I will do well," (Wait) "Hypnosis has improved my memory." (Wait for repetition.)

Now I am going to count to three, and your eyes will slowly open, but you will remain deeply hypnotized, alert and attentive, shutting out all distracting thoughts, and concentrate on remembering what you have previously read. Ready, now, one ... two ... three ... (Make sure the eyes are opened.)

Give S a "Test of Recall, Form B"

Now please write your name and date on the cover sheet, and begin answering the questions on the next page."

Time S allowing eight minutes. At the end of eight minutes:

"Please give me the booklet. Now just let your eyes close again and relax for a while. I am going to be quiet for a few minutes and you may rest, and once again enjoy this experience of being hypnotized. After a few minutes, I will begin talking to you again. You will hear me clearly and respond to what I ask you to do. Now relax ... relax completely.

(Allow S to rest, i.e., remain silent, for one minute.)

Stay completely relaxed, but listen carefully to what I shall tell you next. In a little while I shall begin counting backwards from twenty to one. You will awaken gradually, but you will still be in your state

for most of the count. When I reach "Five" you will open your eyes, but you will not be fully awake. When I get to "one" you will be entirely roused up, in your normal state of wakefullness. After you wake up you will feel refreshed, and not have any pain or stiffness or other unpleasant after affects; but you will feel pleasantly refreshed and relaxed. I shall now count backwards from twenty, and at five, not sooner, you will open your eyes but not be fully aroused until I reach "one." At "one" you will be fully awake. Ready now: 20 - 19 - 18 - 17 - 16 -15 - 14 - 13 - 12 - 11 - 10 (half way there, waking up, more and more) 9 - 8 - 7 - 6 - 5 - 4 - 3 - 2 - 1. Now you are wide awake. How do you feel?"

Engage S in enough conversation about their feelings to make sure they are completely awake and no longer in a state of hypnosis.

Appendix F

Third Session, Form H

Just relax in the chair and make yourself very comfortable. Just let your eyes close ... that's it, just leave your eyes closed while I talk. The important thing is simply for you to relax in the chair, and enjoy this experience.

Let me remind you that your earlier performance has clearly indicated that you are anexcellent subject for our experiment.

Because of your past experiences with hypnosis, you are aware of the feelings that you have as you become more and more deeply hypnotized. You will soon start having these feelings again as you continue to listen to me and become more and more relaxed.

As you relax there, you find it easy just to let things ride by your mind without attending very much to them. You can hear my voice clearly enough, and you can hear, in actuality any other sounds that are around the room--but it is too much effort for you to pay attention to those outside sounds, so nothing makes much impression on your mind except the things that I am saying to you.

In fact, your attention becomes so fixed on what I am saying that you can completely forget about anything else--you stop thinking about anything except what I am about to tell you--you listen to me, very carefully, without any real effort on your part, and you disregard all other thoughts and memories. You become conscious of my voice only, it fills your mind and thoughts and leaves room for you to attend to nothing else.

You know that you can be hypnotized only if you want to be, but there is no reason for you to resist. Just concetrate upon my words and let happen whatever you feel is going to take place. Just let yourself go. What I want from you is merely your willingness to go along and to let happen whatever is about to happen. You know that nothing will be done to make you feel foolish nor to embarrass you.

Now take it easy and just let yourself go. Don't be tense. Just listen carefully to my voice. If your thoughts wander away from it, that is all right, but bring your attention back to it. Sometimes my voice may seem to change a little, or sound as if it were coming from far off. That is all right. Whatever happens, accept it, and just keep listening to my voice as you become more and more relaxed. More and more relaxed. Just listen and relax. Whatever you feel is happening, just let it happen.

Relax more and more. As you think of relaxing, your muscles will relax. Starting with your right foot, relax the muscles of your right leg ... Now the muscles of your left leg ... just relax all over. Relax your right hand, your forearm, upper arm, and shoulder .... That's it.... Now your left hand ... and forearm and upper arm ... and shoulder. Relax your neck, and chest ... more and more relaxed ... completely relaxed.

As you become more hypnotized your body will feel sort of heavy. You will begin to have this feeling of heaviness in your legs and feet ...

in your hands and arms ... throughout your body ... as though you were settling deep into the chair. The chair is strong; it will hold your body as it feels heavier and heavier. You are breathing freely and deeply, freely and deeply. Your whole body is becoming more and more heavy.

You are relaxed, very relaxed. By letting yourself go you become even more relaxed. You can reach a state of deeper, more complete relaxation. There is a pleasant feeling of heaviness throughout your body. You begin to feel so relaxed. It is easier to bring your thoughts back from other things and to attend only to my voice. Soon you will just listen to my voice, as you become more and more deeply relaxed.

You are relaxed, very relaxed. Your whole body feels heavy and relaxed. You feel a pleasant warm tingling throughout your body. Keep your thoughts on what I am saying; listen to my voice. Soon there will be nothing to think of but my voice and my words, while you relax more and more. There are no troubles, no cares to bother you now. Nothing seems important but what my voice is saying, nothing else is important now. You are interested only in what my voice is saying to you. Even my voice may sound a little strange, as though it comes to you in a dream, as you sink deeper into this heaviness, this deep relaxation. Relax, relax ... deeply relaxed. Deeper, deeper, deeper.

You are beginning to feel pleasantly hypnotized. Just keep your thoughts on what I am saying. You are going to become much more hypnotized. Soon you will be deeply hypnotized but you will have no trouble hearing me.. You will not wake up until I tell you to.... Soon I shall begin to count from one to twenty. As I count you will feel yourself going down farther and farther and becoming more and more deeply hypnotized, but you will be able to do what I ask you to do without waking up.... One you are going to become more deeply hypnotized.... Two down, down .... Three ... four ... more and more relaxed ... five ... sic ... seven ... you are sinking into a deep, deep state of hypnosis; nothing will disturb you. I would like you to hold your thoughts on my voice and those things I tell you to think of. You are finding it easy just to listen to the things I tell you.... Eight ... nine ... ten ... halfway there ... always deeply relaxed.... Eleven ... twelve ... thirteen ... fourteen ... fifteen ... although deeply hypnotized you can hear me clearly. You will always hear me distinctly no matter how deeply hypnotized you feel you are .... Sixteen ... seventeen ... eighteen .... Nothing will disburb you. You are going to experience many things that I will tell you to experience.... Nineteen ... twenty. Very deeply hypnotized .... You will not wake up until I tell you to. You will wish to remain comfortably hypnotized and to have the epxeriences I will describe to you.

I want you to realize that you will be able to speak, to move, and even to open your eyes if I ask you to do so, and yet still remain just as deeply hypnotized as you are now. No matter what I ask you to do, you will remain deeply hypnotized until I tell you to wake up.

To show you that you can open your eyes, and still remain deeply hypnotized, I am going to slowly count from 1 to 3. When I do your eyes will open slowly, but you will remain very deeply hypnotized. Ready ... one ... two ... thre. (Make sure eyes have opened) <u>There</u>, your eyes are open, but you are still depply hypnotized ... and you will be able to do this when ever I might ask you to. Now just close your

eyes again, and remain deeply hypnotized. You will find that as I continue to talk to you, my talking will help you to become even more deeply hypnotized. Just listen to my voice.

Sleepiness and drowsiness, which are sometimes associated with hypnosis are not essential to experiencing it. Most people think of hypnosis as a state resembling sleep, since this is often suggested in the induction. The hypnotic state can be a dreamlike state, but it can also be a time when one is completely alert and attentive; with the aid of hypnosis you can block out distractions in the environment and therefore, actively perform many tasks even better than you would in the normal state; in fact, it has been demonstrated that a hypnotic subject can behave very much like a waking subject and still remain in the hypnotic state.... Now, as I count to five you will become as alert as you possibly can, and you will remain alert until I ask you to wake up or be otherwise... you will become very alert and still remain hypnotized... one ... you are getting more and more alert, less and less drowsy; two ... mentally active, no longer drowsy; three ... four ... soon you will be ready to tackle any task that you are asked to perform while hypnotized and yet remain very alert; five ... deeply hypnotized and ready to concentrate ... and <u>very alert</u>.

Now remain deeply hypnotized and alert, and continue to listen carefully to my words. Two weeks ago you read a second reading selection and then answered some questions about it. I would like to see how much of that material you can still remember. But before I do, I want to tell you something.

There is a growing body of evidence that people do not normally use their capabilities to the fullest. The mind is capable of far more than most people believe. For example, some scientists have found evidence that every stimulus, event or fact which we have attended to is permanently stored in the brain, and can be reactivated under proper conditions. Yet psychologists have learned that most people tend to underestimate their ability to remember facts and information. But, I am now going to tell you some things that will let you discover the real extent of your abilities. It has been shown that concentrating intensely permitting <u>nothing</u> to distract you, makes it possible to remember <u>very much more</u> than you would have otherwise expected. Similarly, <u>really</u> desiring and striving to remember, helps to overcome any difficulties there may ordinarily be in doing so. You will find that the <u>more</u> you desire to remember the more you <u>will</u> remember.

Today, while hypnotized, you will think of yourself as being able to remember easily and completely, and you will actually be able to do so. You <u>will</u> do extremely well. In a moment I am going to count from one to ten, and as I count, because of the hypnotized state you are now in, you will actually feel your memory ability increasing. You desire, and your capacity to remember and do well will increase with each number that I say. One ... your mind is clearing ... two ... you are remaining very alert, and becoming more so ... three ... your desire to do well is increasing ... four ... five ... your ability to concentrate is increasing ... six ... seven ... you can feel yourself becoming even more alert ... eight ... a greater and greater desire to remember ... nine ... ten.

Now I want you to repeat after me. "I can feel that my memory

ability has increased." (Wait for repetition.) "I want very much to remember so that I will do well." (Wait) "Hypnosis has improved my memory." (Wait for repetition.)

In a moment I am going to give you a booklet with some questions in it about the article. You will be given eight minutes to complete this test of recall. As before, short, specific answers should be given. Don't make wild guesses, but do write down anything that may come to your mind that you believe might be correct even if you are not certain.

Now, I am going to count to three and your eyes will slowly open, but you will remain deeply hypnotized, alert and attentive, shutting out all distracting thoughts, and concentrate on remembering what you have previously read. Ready now, one ... two ... three ... (Make sure the eyes are opened.)

Give S a "test of Recall, Form B:"

"Now please write your name and date on the cover sheet, and begin answering the questions on the next page."

Time S, allowing eight minutes. At the end of eight minutes:

"Please give me the booklet. Now just let your eyes close again and relax for a while. I am going to be quiet for a few minutes and you may rest, and once again enjoy this experience of being hypnotized. After a few minutes, I will begin talking to you again. You will hear me clearly and respond to what I ask you to do. Now relax ... relax completely."

Allow S to rest, i.e., remain silent, for one minute.

"Stay completely relaxes, but listen carefully to what I shall tell you next. In a little while I shall begin counting backwards from twenty to one. You will awaken gradually, but you will still be in your present state for most of the count. When I reach "five" you will open your eyes but you will not be fully awake. When I get to "one" you will be entirely roused up, in your normal state of wakefulness. After you wake up you will feel refreshed and not have any pain or stiffness or other unpleasant after affects; but, you will feel pleasantly refreshed and relaxed. I shall now count backwards from twenty, and at five , not sooner, you will open you eyes but not be fully aroused until I reach "one." At "one" you will be fully awake. Ready now: 20 - 19 - 18 - 17 - 16 - 15 - 14 - 13 -12 - 11 - 10 (half way there, waking up, more and more) 9 - 8 - 7- 6 - 5 - 4 - 3 - 2 - 1. Now you are vide awake." How do you feel?

Engage S in enough conversation about their feelings to make sure they are completely awake and no longer in a state of hypnosis.

(Invite S to have a drink of water.)

Now I'd like you to sit back in your chair, relax, and close your eyes. Just listen to what I am going to tell you, but do not let yourself go into hypnosis. Remain relaxed, but alert and wide awake, with your eyes closed. It is very important that you do not go into a hypnotic state.

I would like to see if you can remember anything else about the second article that you read two weeks ago. We are interested in comparing your ability to remember when you are not hypnotized with your ability to remember when you were hypnotized.

It may come as somewhat of a surprise to you, but there is also evidence that with the proper set and orientation, the mind like the body, is capable of far more than people believe even when not hypnotized.

You remember, for example, how apparently impossible a four-minute mile used to be considered--that is, until one man was able to do it. In the same way, the mind is capable of far more than we might think, if only we push ourselves to the utmost and really concentrate on what we are doing.

Shut out all distracting thoughts and sounds, and concentrate on this task. When you try harder, you will find that you will remember still more of the information.

If you will mobilize all your energies of concentration, block out all distractions, you can become completely alert and attentive; by doing this and yet not becoming hypnotized you can actively perform tasks better than you would otherwise. As I count to five you will become as alert as you possibly can, and you will remain alert and attentive. You will <u>not</u> become hypnotized but you will become very alert ... one ... you are getting more and more alert ... two ... mentally active and attentive ... three ... four ... soon you will be ready to tackle any task you are asked to perform ... five you are very alert and ready to concentrate ... <u>very alert</u>.

In order to perform at your maximum you must imagine what it is like to do the task to the best of your ability and then you will actually begin to feel more alert, attentive, and more capable, enabling you to actually perform at your best.

Even though you are now not hypnotized, I want you to think of yourself as being able to remember easily and completely and you will find that you will be able to do so. I want you to have an unusually strong desire to do well. You will do extremely well. I am taking it for granted that you are here because you want to be, because you want to help the scientific process towards discovering new things about our minds; and for this research that means that you are eager to explore potentialities with us and do your utmost on these tasks. It is very important to us, in conducting this experiment, to find out exactly how well you can do on this task. You are very alert and attentive and because of this you will be able to concentrate on the task. You are not becoming hypnotized and you must not allow yourself to enter a hypnotic state.

Now, once again I would like you to anser these questions.
Hand <u>S</u> new "Test of Recall Form B"

Again please write your name and date on the form. Time <u>S</u> and allow a full eight minutes, but do not indicate the passage of any time. (i.e., do not indicate when 3, 2, or 1 minute is left.)

At the end of eight minutes. That is fine, please give me the booklet. That concludes this part of the research. We very much appreciate your cooperation with us.